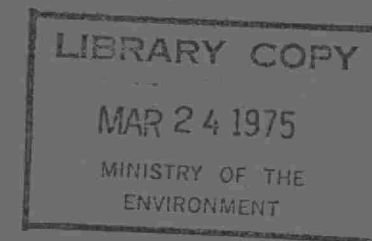


OPERATING SUMMARY

UNION

WATER SYSTEM

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Ontario

MINISTRY OF THE ENVIRONMENT

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Honourable William G. Newman

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
REGIONAL OPERATIONS
J. Barr

REGIONAL OPERATIONS DIVISION

DIRECTOR, SOUTHWESTERN REGION
D. McTavish

MANAGER, UTILITY OPERATIONS
A. Ladbrooke

UNION WATER SYSTEM

operated for the

TOWN OF ESSEX
TOWN OF KINGSVILLE
TOWN OF LEAMINGTON
TOWNSHIP OF GOSFIELD NORTH
TOWNSHIP OF GOSFIELD SOUTH
TOWNSHIP OF MAIDSTONE
TOWNSHIP OF MERSEA
TOWNSHIP OF ROCHESTER
H.J. HEINZ COMPANY OF CANADA LIMITED

by the

MINISTRY OF THE ENVIRONMENT

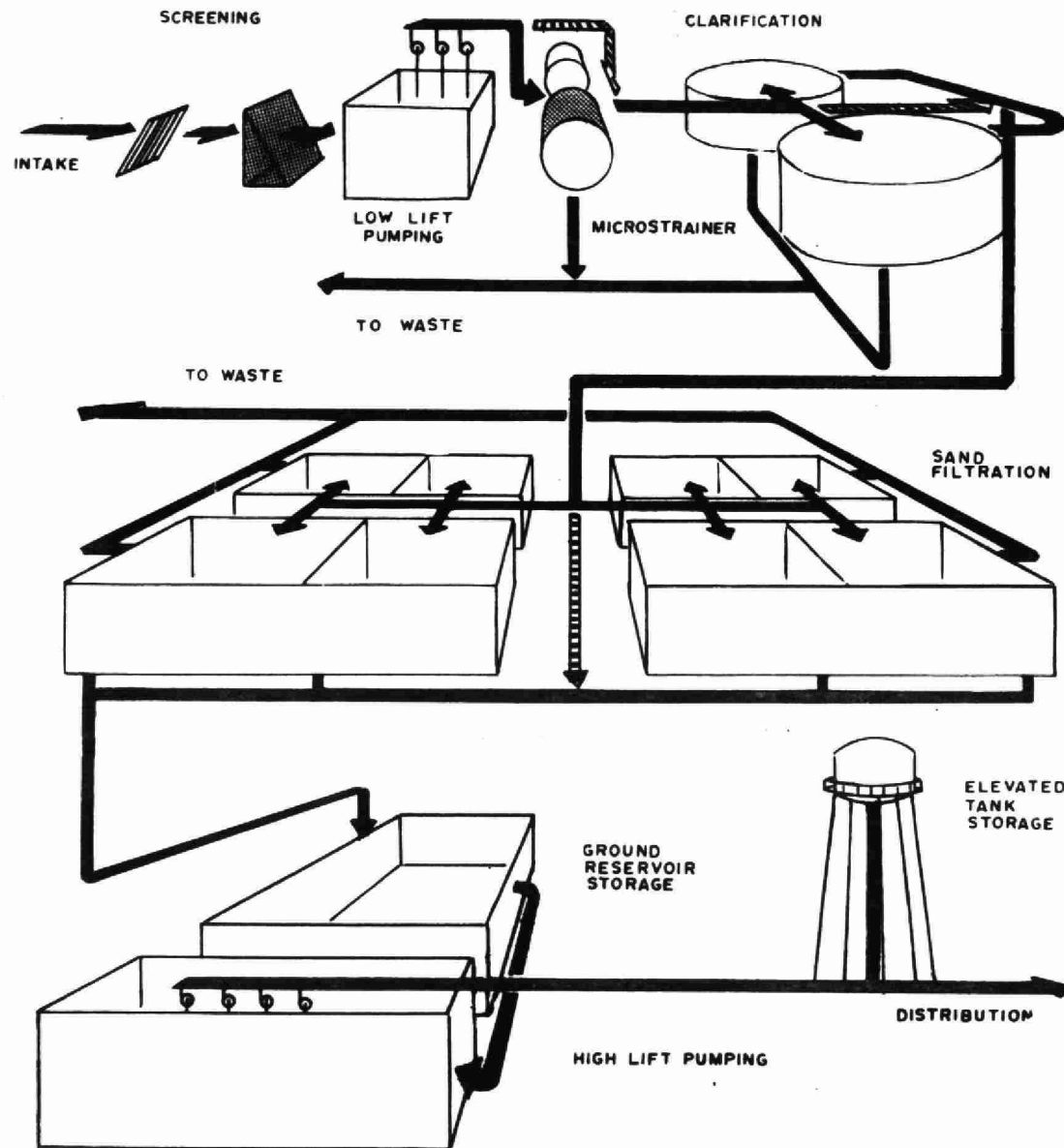
1973 ANNUAL OPERATING SUMMARY

prepared by
Plant Performance Unit
TECHNICAL SERVICES BRANCH
T. Cross, Director

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UNION WATER TREATMENT PLANT



DESIGN DATA

UNION Water Treatment Plant

NOMINAL CAPACITY

10.0 MIGD

RAW WATER SOURCE

Lake Erie

CAPACITY OF UNITS

Intake: 32 mgd @ 3.5 ft/sec avg. vel.
Low Lift Pumps: 14.6 mgd @ 132 ft tdh
Microstrainers: 16.0 mgd
Clarifiers: 16.0 mgd
Filters: 8.0 mgd @ 2.15 gpm/ft²
Backwash Pump: 5520 USGPM @ 35 ft tdh
High Lift Pumps: 24.3 mgd @ 200 ft tdh

MICROTRAINING

Two Glenfield 10 ft dia x 10 ft with
MKI (35 micron) fabric @ 16.0 mgd
total capacity

CLARIFICATION

One Graver and one Eimco Re-
activator, each 94 ft dia x 19 ft swd
Volume: 1.65 mil gal
Detention: 2.5 hr @ 16.0 mgd
Overflow: 1160 gpd/ft² @ 16.0 mgd

FILTRATION

Type: Gravity sand filter - 27" sand
depth
Size: Four 18' x 36' double filters
Rate: 2.15 gpm/ft² @ 8.0 mgd
(nominal capacity)
Backwash Rate: 13 gpm/ft²
Jet wash - Palmer surface jet wash

CHLORINATION

Three Wallace & Tiernan 2000 lb/
day chlorinators

HIGH LIFT PUMPING

#6 - 2.60 mgd @ 200' head
#7 - 3.75 mgd @ 200' head
#8 - 5.19 mgd @ 200' head
#9 - 10.35 mgd @ 200' head
#10 - 1.15 mgd @ 200' head

STORAGE

Reservoir: 1.73 mil gal
Elevated Tank: 0.33 mil gal

INTAKE

10' dia. steel bellmouth in 18' x 18'
timber crib
Depth above crib - 15 ft (minimum)
Pipe Size: 1400 ft of 54" dia asbestos
coated corrugated steel pipe-about $\frac{1}{4}$
mile to plant

SCREENING

Coarse Screens - 3" cc
Fine Screens - $\frac{1}{4}$ " mesh travelling
screens

LOW LIFT PUMPING

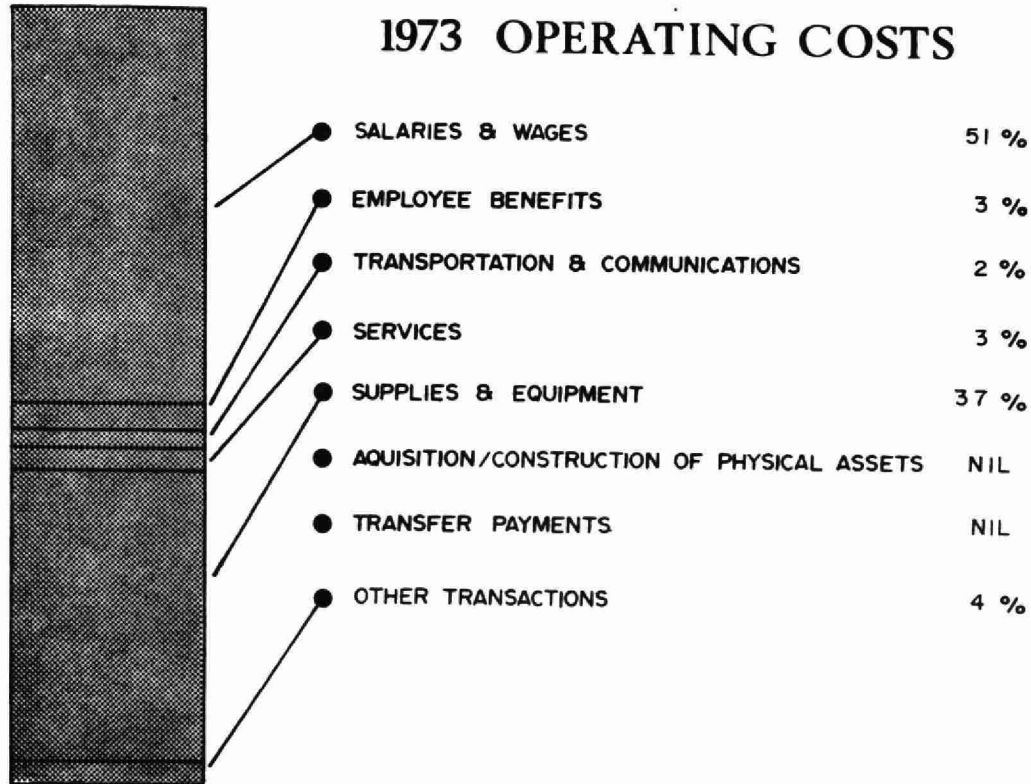
#1 - 2.16 mgd @ 100' TDH
#2 - 4.32 mgd @ 100' TDH
#3 - 4.32 mgd @ 100' TDH
#4 - 2.16 mgd @ 100' TDH
#5 - 6.00 mgd @ 135' TDH

*Note: As of November 1970

—PROJECT COSTS and FLOWS TO PARTICIPANTS—

ANNUAL COSTS

1973 OPERATING COSTS



YEARLY OPERATING COSTS

YEAR	WATER TREATED in million gallons	TOTAL	UNIT COSTS
		OPERATING COSTS	cents per 1000 gal
1968	1466	\$ 137,283	9.4
1969	1445	146,059	10.1
1970	1547	159,235	10.9
1971	1696	182,404	10.7
1972	1636	183,529	11.0
1973	1737	197,045	11.3

ACCOUNT 6-0012-57-1 'Common'

OPERATING EXPENDITURES

SALARIES AND WAGES	<u>\$100,045</u>
EMPLOYEE BENEFITS	<u>5,582</u>
TRANSPORTATION & COMMUNICATIONS	<u>4,314</u>
SERVICES	<u>5,184</u>
SUPPLIES AND EQUIPMENT	<u>71,956</u>
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	<u>0</u>
TRANSFER PAYMENTS	<u>68</u>
OTHER TRANSACTIONS	<u>7,858</u>
TOTAL	<u>\$195,017</u>

ACCOUNT 6-0012-57-2 'East'

OPERATING EXPENDITURES

SALARIES AND WAGES	<u>0</u>
EMPLOYEE BENEFITS	<u>0</u>
TRANSPORTATION & COMMUNICATIONS	<u>0</u>
SERVICES	<u>0</u>
SUPPLIES AND EQUIPMENT	<u>428</u>
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	<u>0</u>
TRANSFER PAYMENTS	<u>0</u>
OTHER TRANSACTIONS	<u>17</u>
TOTAL	<u>\$445</u>

ACCOUNT 6-0012-57-3 'West'

OPERATING EXPENDITURES

SALARIES AND WAGES	<u>0</u>
EMPLOYEE BENEFITS	<u>0</u>
TRANSPORTATION & COMMUNICATIONS	<u>273</u>
SERVICES	<u>0</u>
SUPPLIES AND EQUIPMENT	<u>1,310</u>
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	<u>0</u>
TRANSFER PAYMENTS	<u>0</u>
OTHER TRANSACTIONS	<u>0</u>
TOTAL	<u>\$1,583</u>

ANNUAL CONSUMPTION BY PARTICIPANTS

PARTICIPANT	MINIMUM ANNUAL QUOTA REVISIONS				ANNUAL CONSUMPTION in millions of gallons and as percent of total (listed below)									
	ORIGINAL	REVISED Jan. 1, 63	PLANT EXPANSION Nov. 1, 70	KINGSVILLE and ROCHESTER Entry Jan. 1, 71	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
H. J. HEINZ	520	520	520	520	594.00 40.0	572.23 38.0	573.48 39.1	578.71 40.0	551.59 37.7	592.10 36.0	593.58 36.4	676.30 39.3		
LEAMINGTON	426	400	400	380	416.38 28.0	416.57 27.6	391.85 26.7	278.71 26.2	379.09 25.9	424.78 25.8	458.70 28.2	457.57 26.6		
ESSEX	160	160	180	180	179.12 12.0	195.49 13.0	197.82 13.5	184.72 12.7	188.12 12.9	202.70 12.3	170.43 10.4	163.37 9.5		
MERSEA	125	70	140	140	158.53 10.7	165.23 11.0	160.61 11.0	152.48 10.6	173.64 11.9	212.18 12.9	207.67 12.7	214.39 12.4		
GOSFIELD S	165	40	100	100	87.37 5.9	102.66 6.8	83.12 5.7	93.82 6.5	102.49 7.0	130.65 7.9	114.14 7.0	117.90 6.8		
GOSFIELD N	235	20	35	35	32.93 2.2	31.06 2.1	35.82 2.4	27.81 1.9	31.87 2.2	39.50 2.4	48.22 2.9	48.16 2.8		
MAIDSTONE See Note C	12	10	20	20	11.48 0.8	14.72 1.0	13.70 0.9	18.56 1.3	23.17 1.6	25.92 1.6	23.12 1.4	27.75 1.6		
KINGSVILLE See Note A	-	-	-	133	- -	- -	- -	- -	- -	- -				
ROCHESTER See Note B	-	-	-	14	6.71 0.5	8.70 0.6	9.12 0.6	11.47 0.8	12.74 0.9	16.35 1.0	16.08 1.0	16.55 1.0		
TOTAL	1170.5	1220	1395	1522	1486.52	1506.66	1465.52	1445.28	1462.72	1644.18	1631.95	1721.97		

Note A - Kingsville became participant Jan 1/71, however water is not available until completion of project.

B - Rochester became participant Jan 1/71, purchased water through Maidstone prior to this date.

C - Rochester flows have been deducted from Maidstone flows.

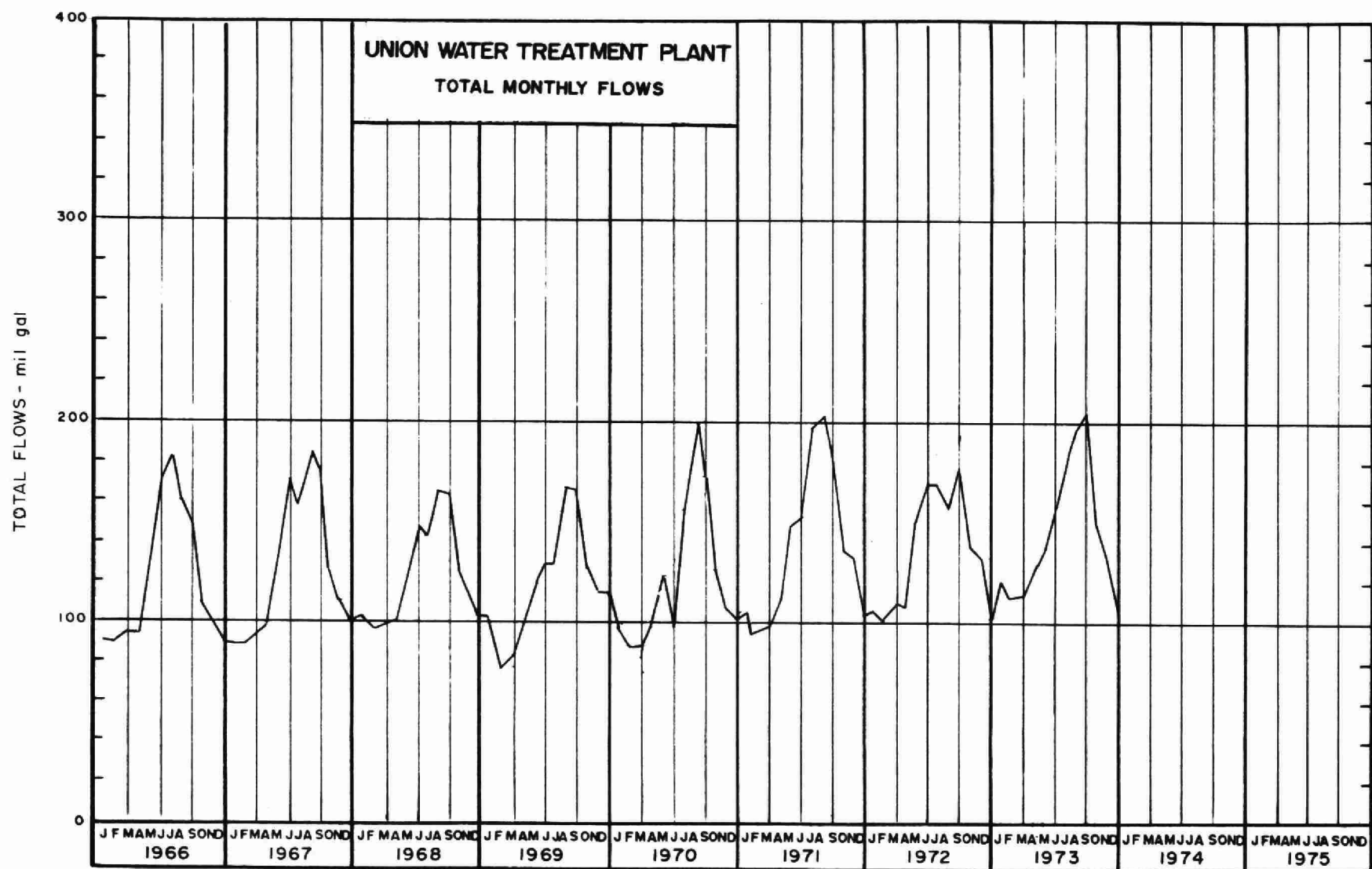
ADJUSTED MONTHLY FLOWS

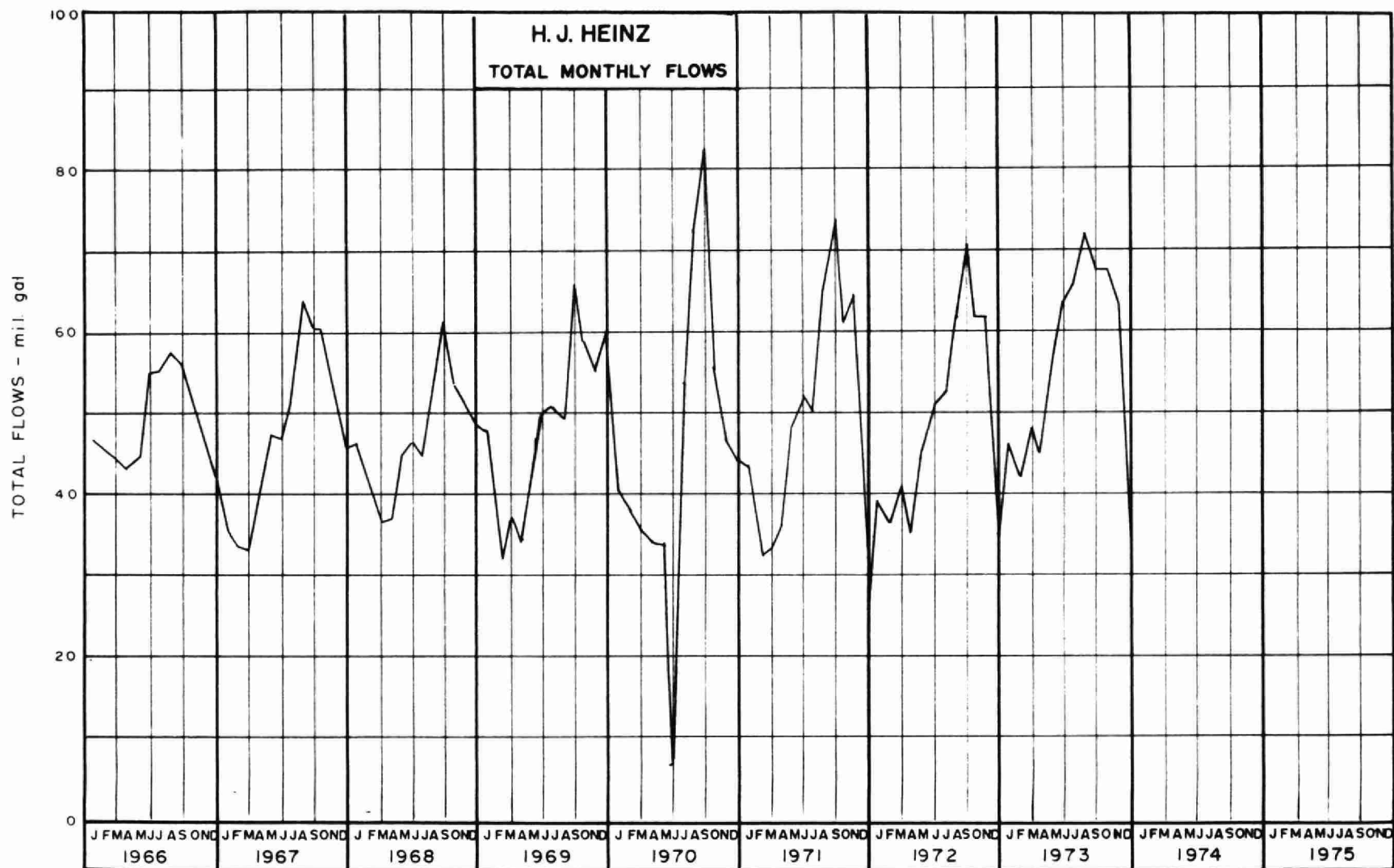
(in millions of gallons)

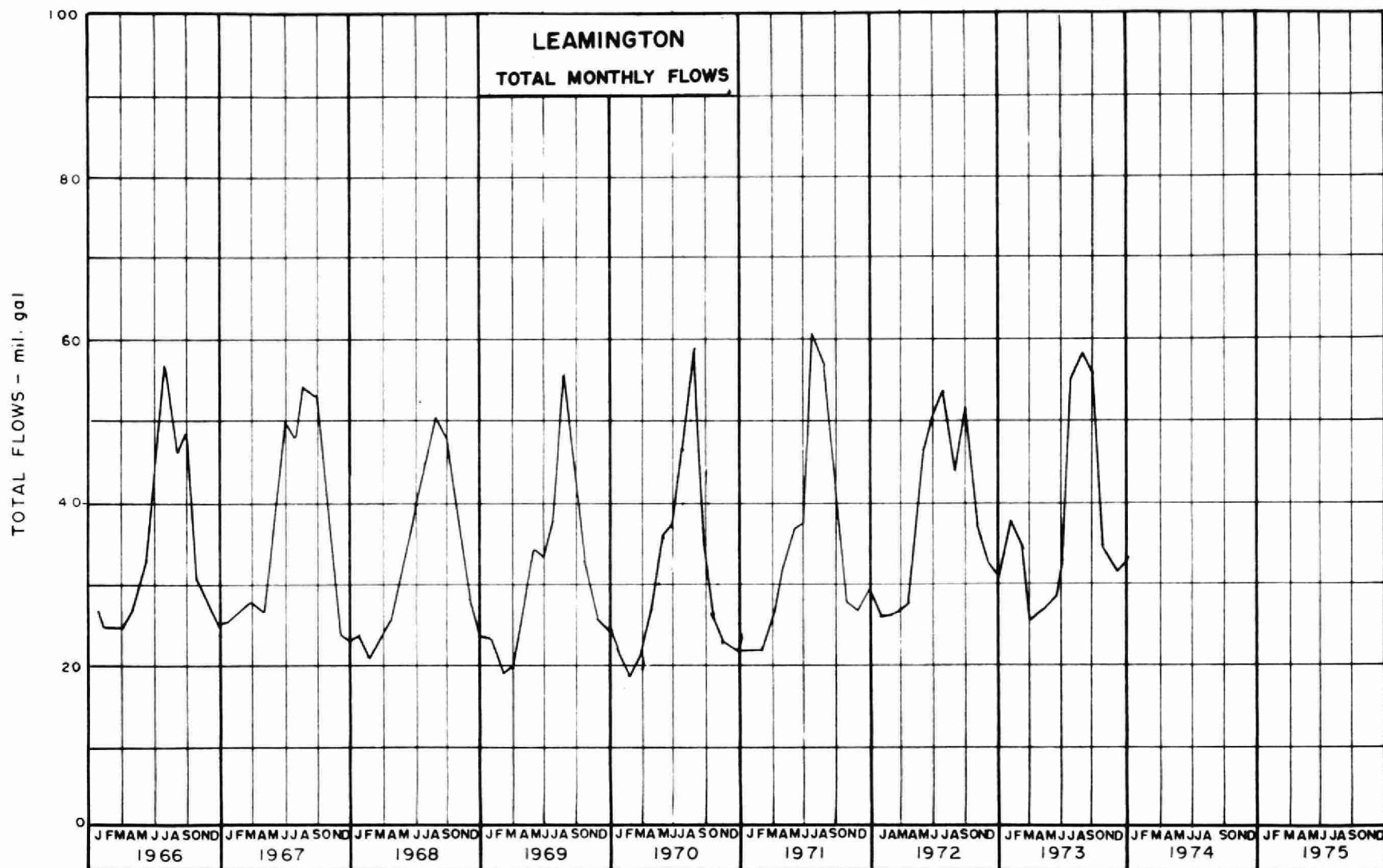
MONTH	H. J. HEINZ	LEAMINGTON	ESSEX	MERSEA	GOSFIELD SOUTH	GOSFIELD NORTH	MAIDSTONE + ROCHESTER		KINGSVILLE	TOTAL
JAN	46.561	38.944	12.902	10.372	5.550	3,520	2.686		0	120.535
FEB	42.637	35.502	11.761	9.456	5.059	3,208	2.448		0	110.071
MAR	48.125	25.068	10.853	15,095	6.925	3.336	3.292		0	112.694
APR	45.778	26.961	11.673	16.235	7.448	3.587	3.541		0	115.223
MAY	57.868	28.652	13.188	21.201	10.287	3.614	3.463		0	130.273
JUNE	64.448	33.151	15.260	<u>24.530</u>	11.903	4.182	4.007		0	157.481
JULY	66.009	55.348	16.132	<u>24.694</u>	12.442	4.538	4.425		0	183.589
AUG	72.579	58.233	16.973	<u>25.981</u>	13.091	4.775	4.656		0	196.288
SEPT	67.716	56.714	19.404	<u>26.895</u>	<u>19.599</u>	<u>6.370</u>	<u>5.580</u>		0	202.278
OCT	67.311	35.041	11.889	16.617	12.109	3.935	3.447		0	150.449
NOV	64.458	31.548	11.461	11.501	6.652	3.497	3.331		0	132.448
DEC	32.807	32.405	11.773	11.813	6.833	3.593	3.421		0	102.645
TOTAL	676.297	457.567	163.369	214,390	117.898	48.155	44,298 *		0	1721.974

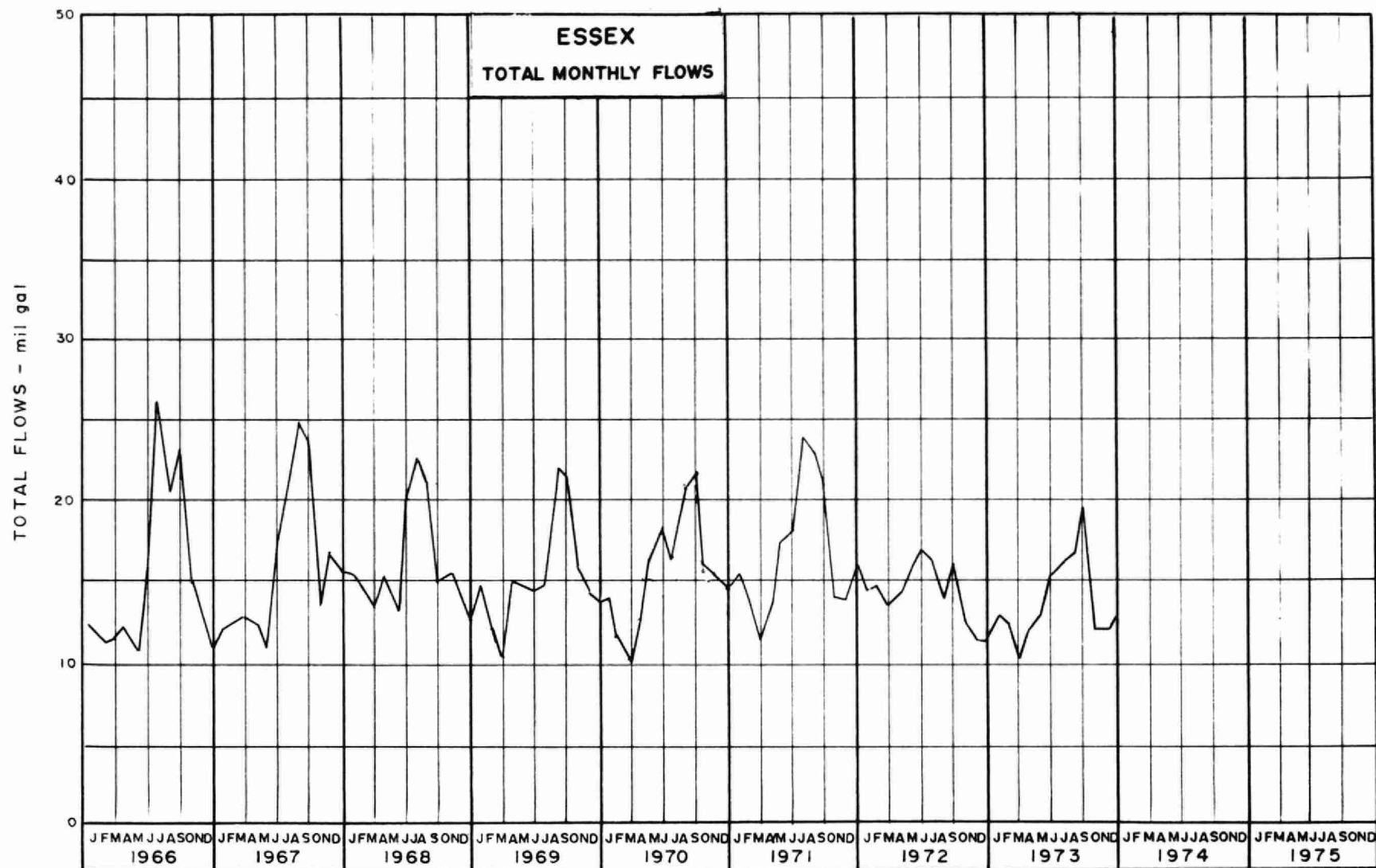
The underlined monthly flows denote months in which the max. monthly quota was exceeded. Data on separate Rochester Flows was not available at the time of preparation of this report.

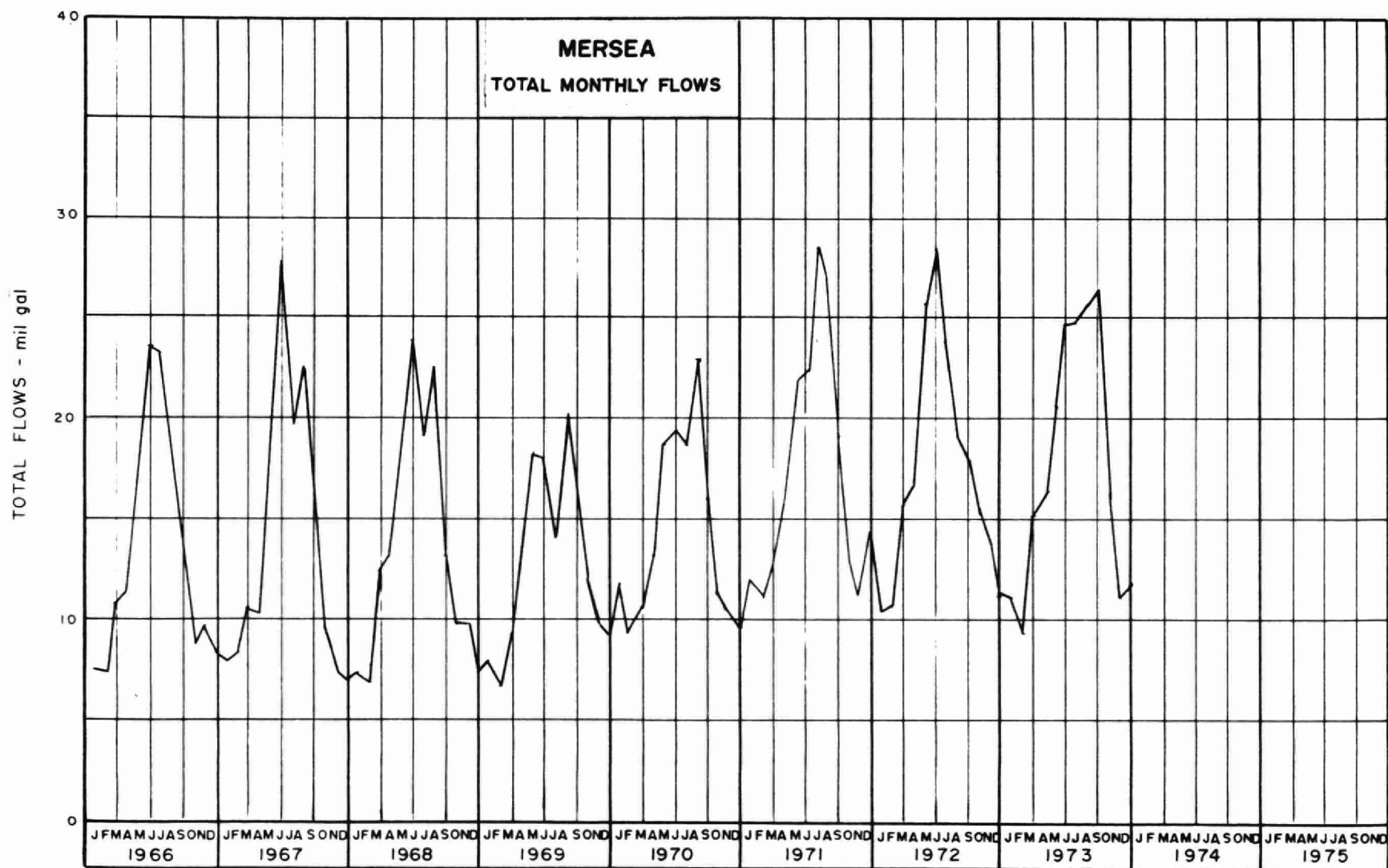
* Maidstone 27,748
Rochester 16,550

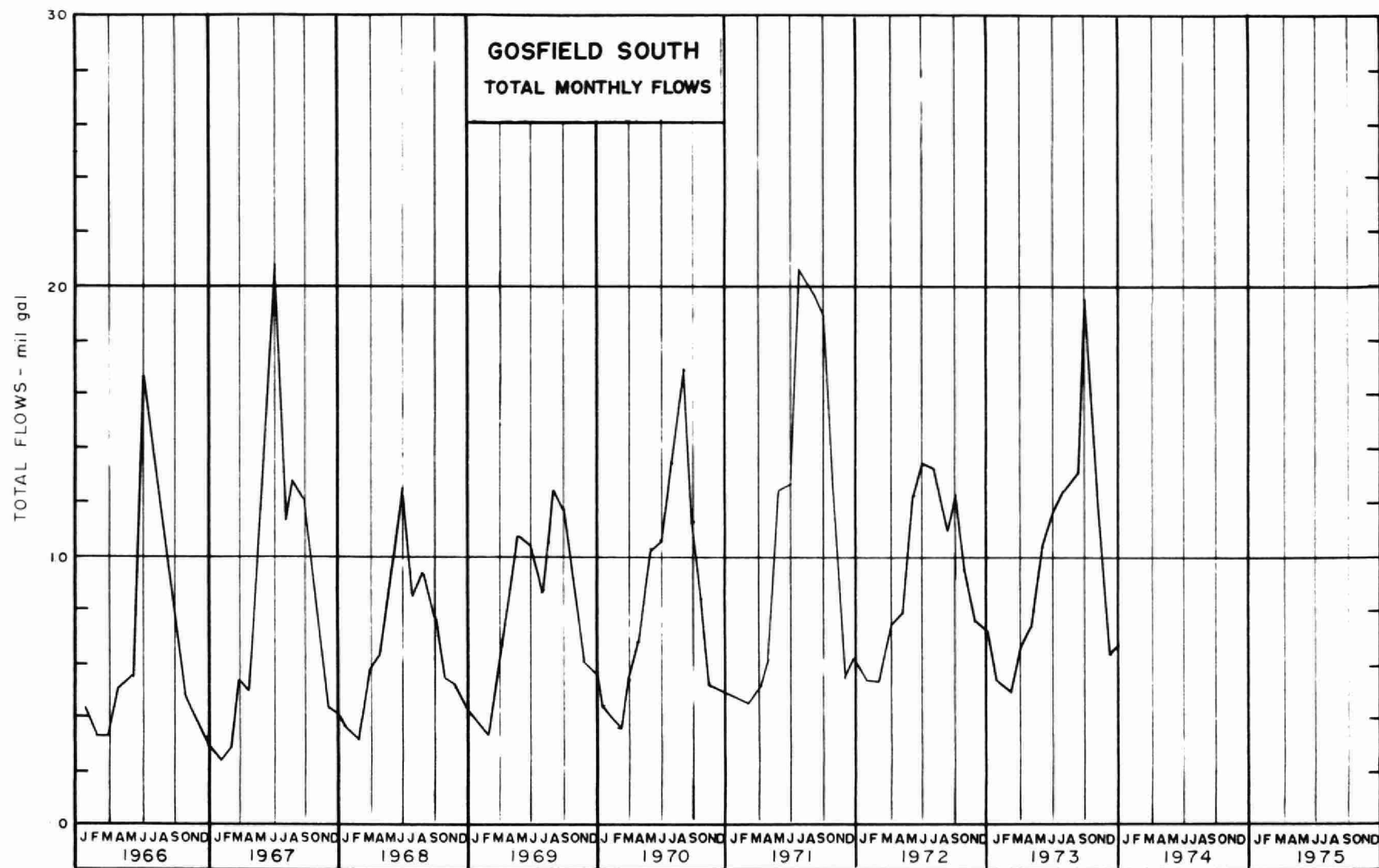


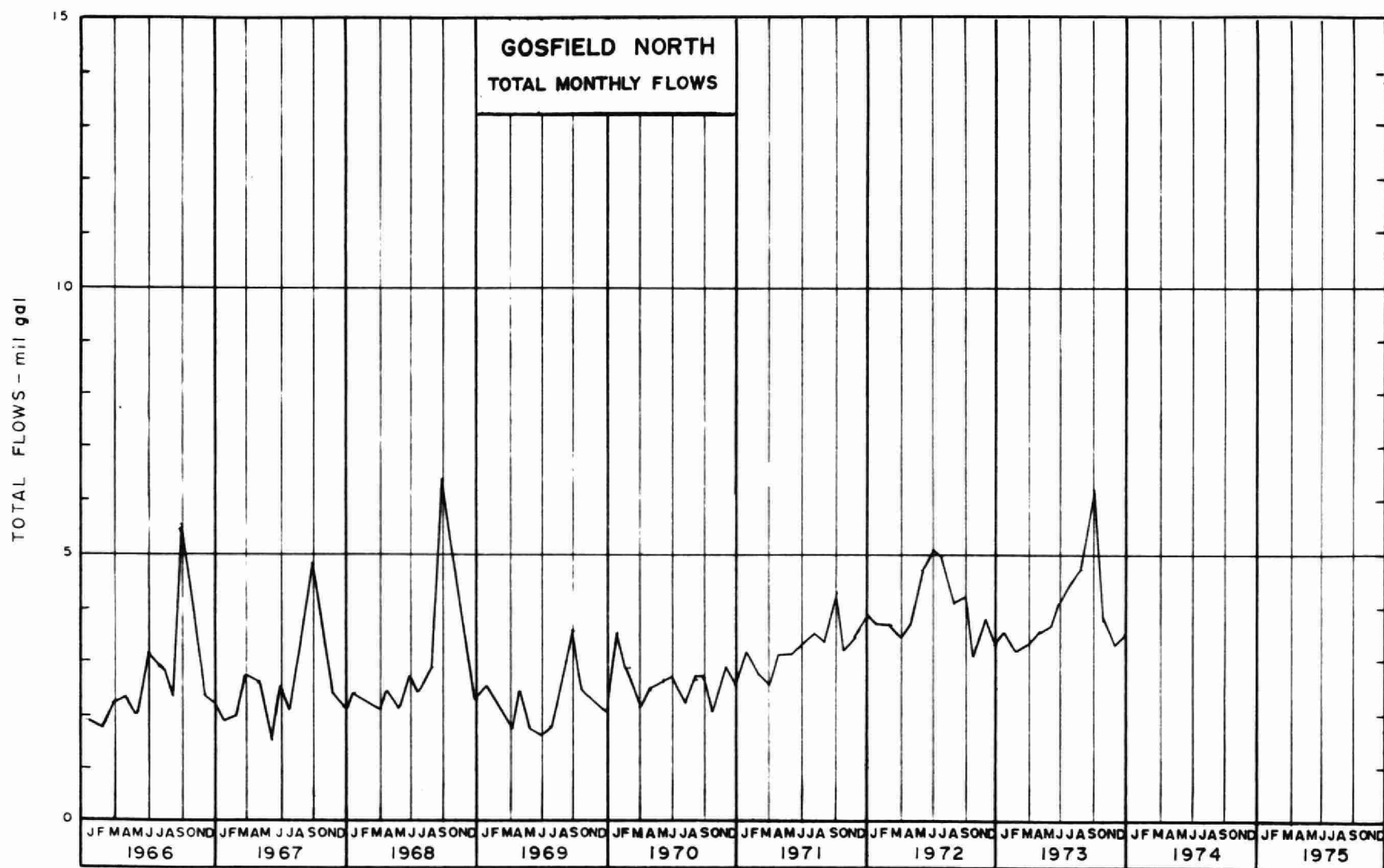


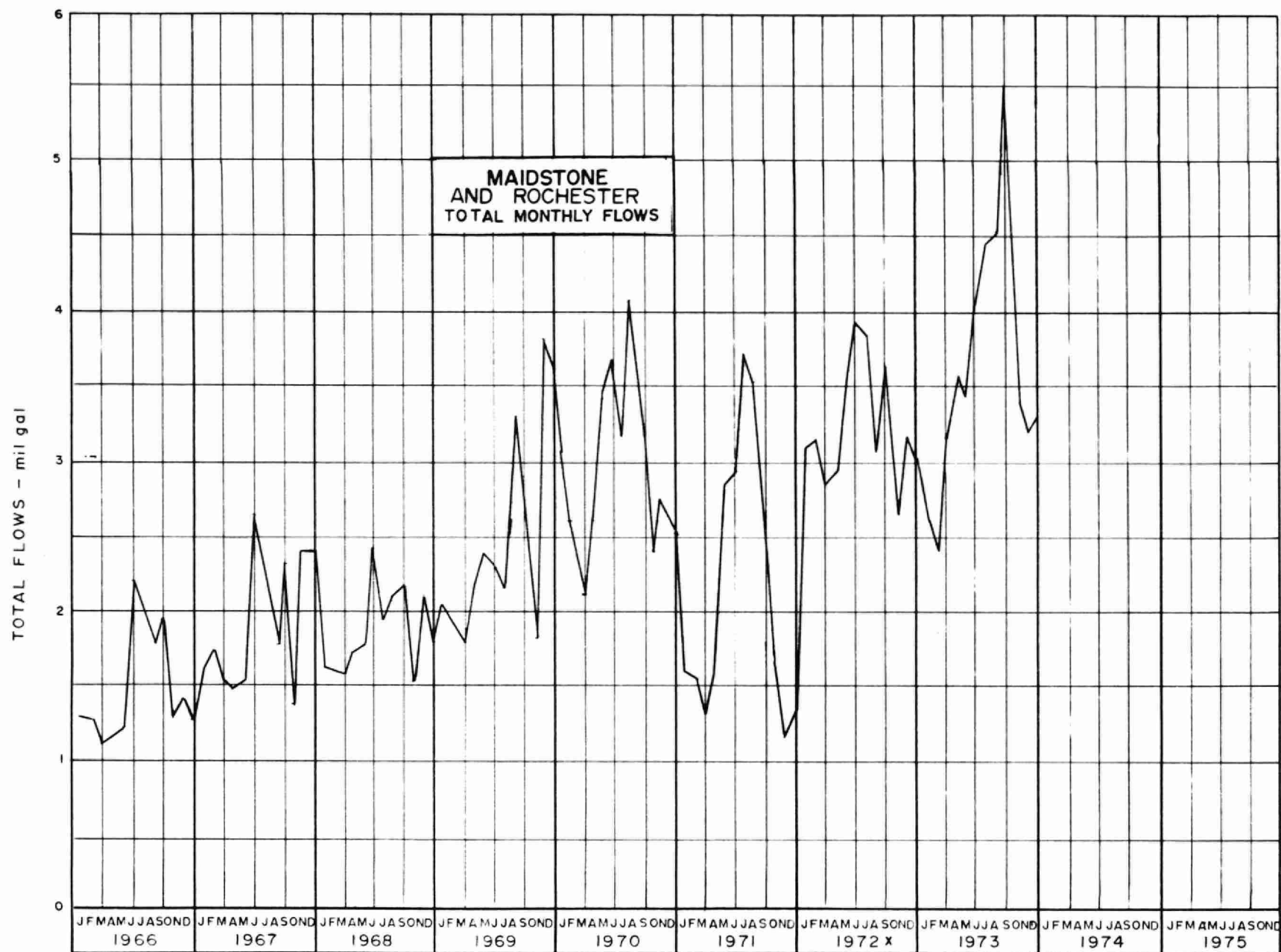




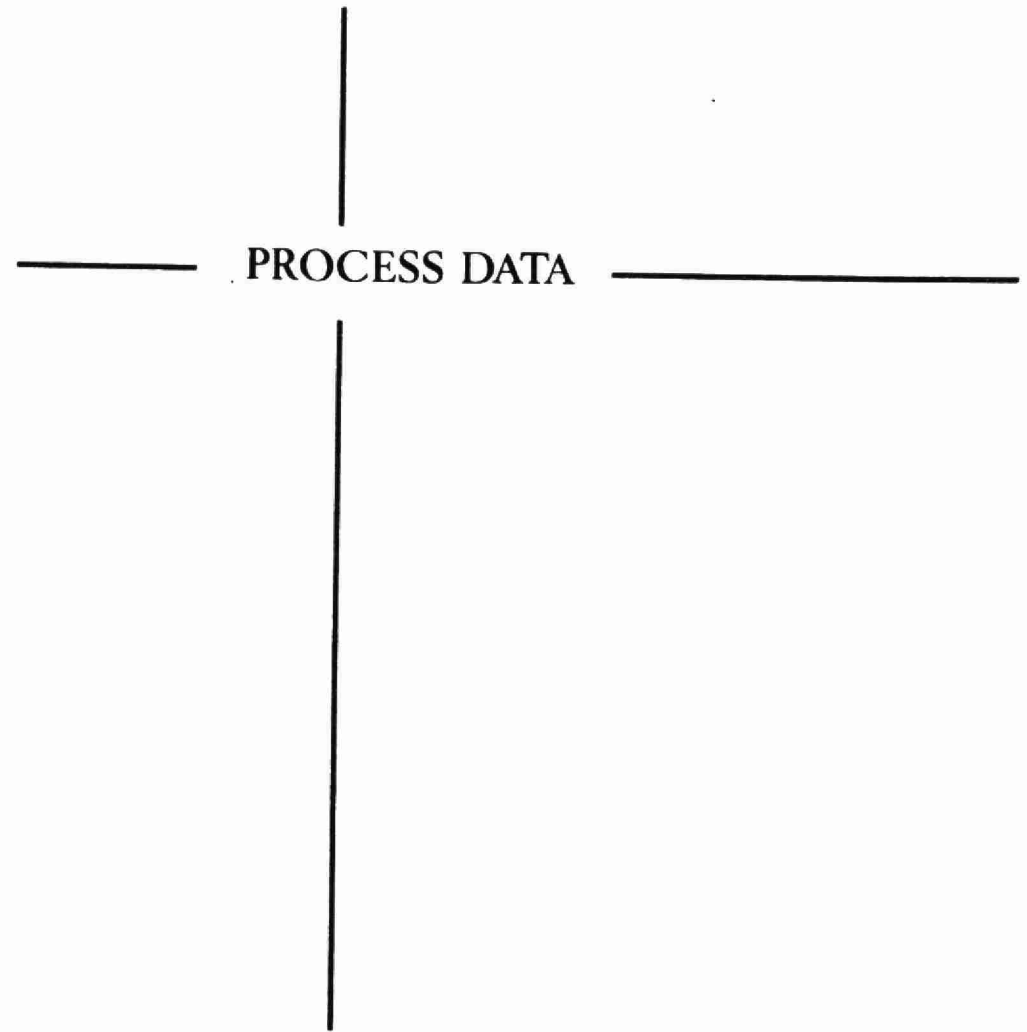




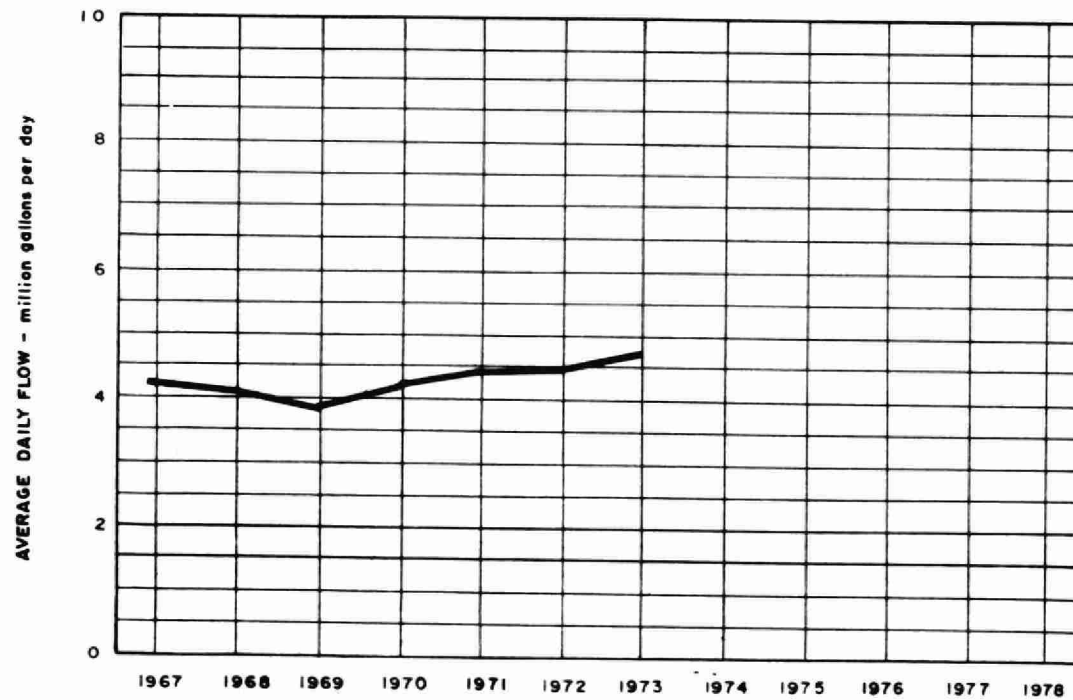
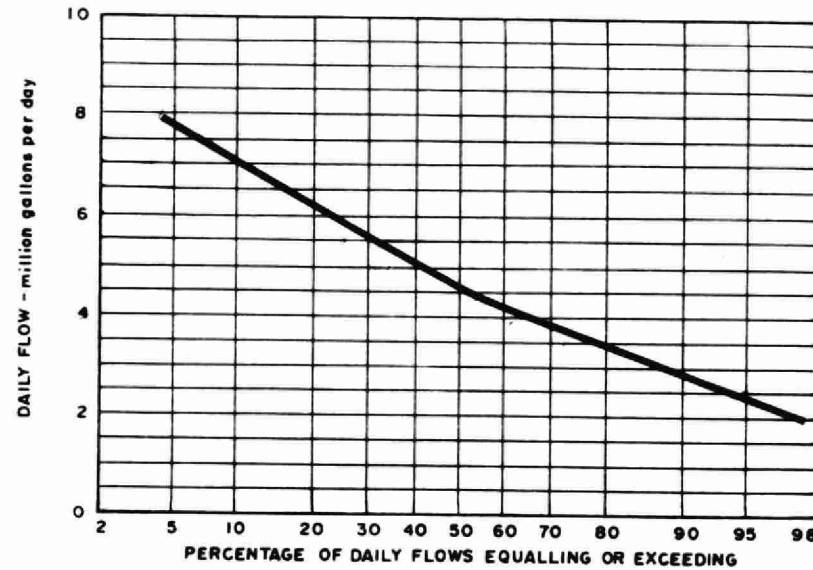




x Rochester added



FLOWS



DESIGN CAPACITY 16 MGD

PLANT PERFORMANCE

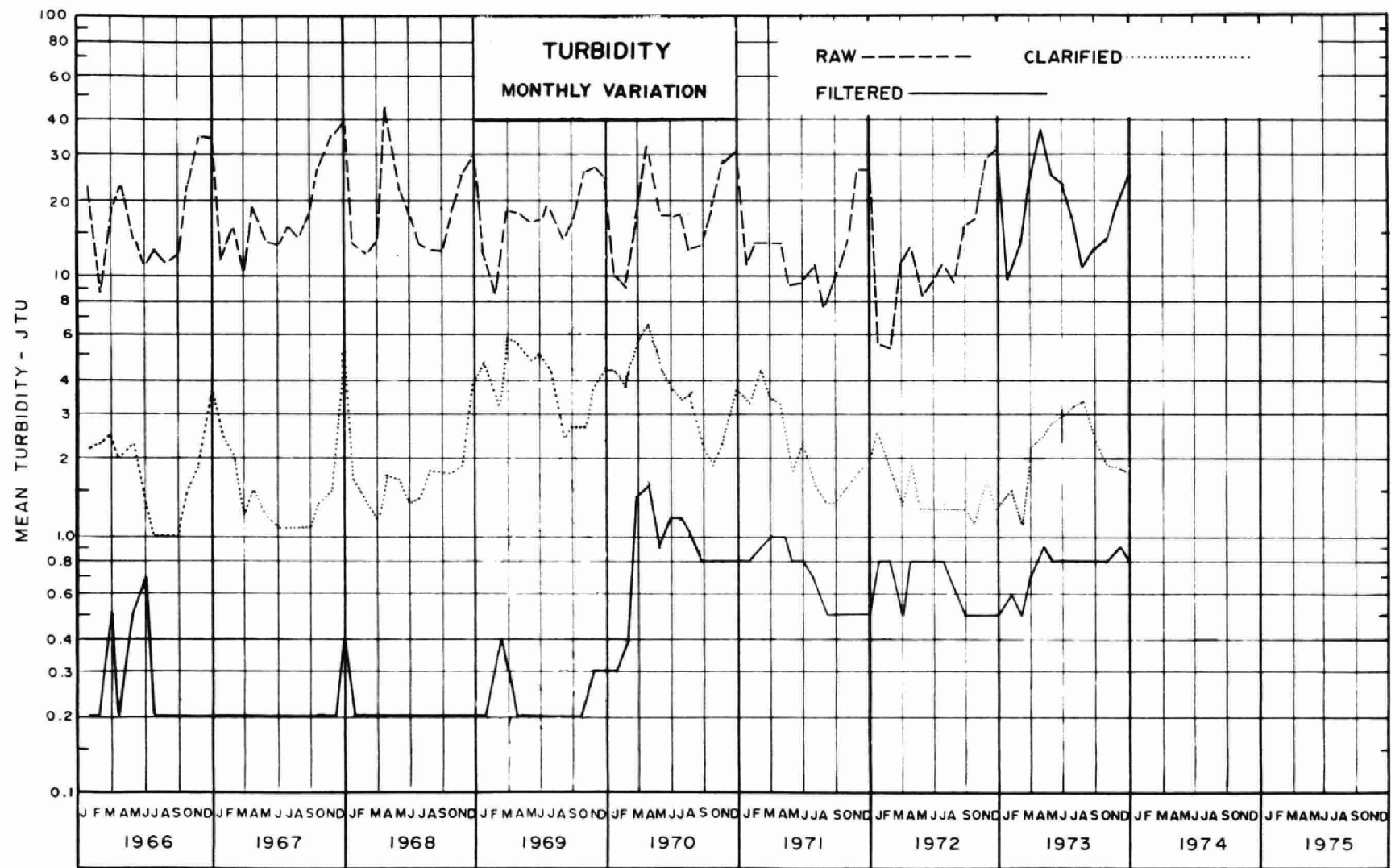
MONTH	FLOWS				RAW WATER		TREATED WATER					
	TOTAL PLANT OUTPUT million gallons	AVERAGE DAILY FLOW million gallons	MAXIMUM DAY'S FLOW million gallons	MAXIMUM RATE mgd	TURBIDITY (AVERAGE) FTU	COLOUR (AVERAGE) App. units	TURBIDITY		COLOUR		TEMPERATURE	
							AVERAGE FTU	MAXIMUM FTU	AVERAGE App. units	MAXIMUM App. units	AVERAGE ° F	MAXIMUM ° F
JAN	117.3	3.78	5.14	7.05	9.9	5	0.6	1.1	<5	<5	33	33
FEB	107.1	3.83	4.60	6.62	14.7	5	0.8	1.5	<5	<5	33	33
MAR	113.2	3.65	4.68	6.98	24.5	16	0.7	1.0	<5	<5	35	38
APR	115.9	3.86	4.83	7.27	37.3	45	0.9	1.0	<5	<5	44	49
MAY	144.2	4.65	5.80	8.06	25.7	10	0.8	2.0	<5	<5	52	55
JUNE	164.2	5.47	6.68	9.07	24.1	7	0.8	1.1	<5	<5	63	70
JULY	188.5	6.08	8.89	11.80	17.7	38	0.8	1.0	<5	<5	74	76
AUG	201.5	6.50	9.65	13.20	10.4	5	0.8	1.0	<5	<5	75	77
SEPT	201.4	6.71	9.98	12.40	12.7	10	0.8	1.0	<5	<5	70	78
OCT	149.2	4.81	6.05	8.64	14.5	8	0.8	1.0	<5	<5	62	65
NOV	131.4	4.38	5.47	7.70	19.6	10	0.9	1.2	<5	<5	48	58
DEC	103.4	3.34	4.98	6.70	25.8	37	0.8	1.1	<5	<5	37	44
TOTAL	1737.3											
AVG.		4.76	MAXIMUM 9.98	MAXIMUM 13.20	19.7	16	0.8	MAXIMUM 2.0	<5	MAXIMUM <5	52	MAXIMUM 78

CHLORINATION and DISINFECTION

MONTH	RAW WATER					PLANT EFFLUENT		DISTRIBUTION SYSTEM		CHLORINATION			
	NUMBER OF SAMPLES HAVING TOTAL COLIFORM ORGANISMS PER 100 ml OF					NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	TOTAL AMOUNT OF CHLORINE USED 10 ³ pounds	DOSAGE		RESIDUAL IN PLANT EFFLUENT mg/l
	0	1 - 3	4 - 32	33 - 320	> 320						PRE - mg/l	POST - mg/l	
JAN			1	3	1	4	0	48	0	2.0	1.3	0.5	0.5
FEB			3	1	0	3	0	39	0	2.0	1.3	0.5	0.5
MAR				1	3	4	0	36	0	2.4	1.4	0.4	0.5
APR			2	2	0	4	0	34	0	2.4	1.7	0.5	0.5
MAY				2	2	4	0	34	0	3.7	2.0	0.6	0.5
JUNE			1	1	2	4	0	35	1	4.8	2.2	0.6	0.5
JULY			1	2	2	5	0	44	0	7.7	3.5	1.0	0.5
AUG			1	1	2	4	0	33	1	8.5	3.4	1.1	0.5
SEPT			1	2	1	4	0	36	0	8.6	3.1	1.0	0.5
OCT			1	3	1	5	0	45	0	4.5	2.4	0.7	0.5
NOV				1	2	3	0	29	0	2.6	1.8	0.5	0.5
DEC				2	2	4	0	33	0	2.0	1.6	0.5	0.5
TOTAL	0	0	11	21	18	48	0	446	2	50.9			
AVG.	140 (NOTE - Average shown is the GEOMETRIC MEAN)									140 pounds per day	2.1	0.7	0.5

TREATMENT DATA

MONTH	FILTER OPERATION		CHEMICALS USED							
	BACKWASH	TOTAL	A L U M		ACTIVATED CARBON		SODIUM SILICATE		SODIUM BICARBONATE	
	WATER mil. gal.	FILTER HOURS	AMOUNT USED 10 ³ gallons	DOSAGE mg/l	AMOUNT USED pounds	DOSAGE mg/l	AMOUNT USED 10 ³ pounds	DOSAGE mg/l	AMOUNT USED pounds	DOSAGE mg/l
JAN	1.96	1457	5.3	29	0		1.5	5.0	336	1.1
FEB	1.74	1119	4.9	29	0		1.5	4.9	336	1.1
MAR	1.79	1327	5.3	31	0		2.0	5.0	462	1.1
APR	1.46	1332	5.3	30	0		1.9	4.9	420	1.1
MAY	1.79	1444	6.0	27	105	2.2	2.2	3.9	504	0.9
JUNE	1.85	1781	6.8	27	315	1.9	1.7	3.4	378	0.8
JULY	2.41	2059	7.9	27	560	1.5	2.2	3.0	504	0.7
AUG	2.69	2260	7.5	24	525	1.3	1.7	2.9	378	0.6
SEPT	2.97	2252	8.7	28	385	1.4	1.5	2.8	336	0.6
OCT	1.90	1670	6.0	26	385	2.7	1.7	3.9	378	0.9
NOV	1.79	1529	5.3	26	0	0	1.5	4.3	336	1.0
DEC	0.90	1239	3.5	22	0	0	1.5	5.6	336	1.2
TOTAL	23.25	19467	72.5		2275		20.9		4704	
AVG.		53	0.14	27	99	1.8	0.19	3.9	42	0.9



WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	
HARDNESS in mg/l as CaCO_3	26	121	138	108	26	122	138	110	80 - 100
ALKALINITY in mg/l as CaCO_3	26	90	105	84	26	75	91	67	30 - 100
IRON in mg/l Fe	26	1.31	8.30	0.10	26	<0.05	<0.05	<0.05	Less than 0.3
CHLORIDE in mg/l Cl^-	26	21	24	16	26	22	26	18	Less than 250
pH in pH units	26	7.7	8.1	7.3	26	7.2	7.5	6.7	7.0 - 8.5
TURBIDITY in FTU	26	17.0	84.0	2.5	26	0.21	1.50	0.05	Less than 1
COLOUR in apparent units	26	17.0	100.0	<5	26	<5	<5	<5	Less than 5

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